AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Currently Amended) A spectrometer for analysing a sample produced by an inductively coupled plasma torch in which a normal plasma is created in a tube of the spectrometer by application of gas to the torch and activation of an induction coil to heat the gas and therefore produce the normal plasma, ~~and which~~ wherein the normal plasma is constrained within the tube, is separated from the tube and is capable of collapsing into a toroidal ~~or faulty~~ plasma ~~shape~~, the spectrometer comprising:

a detector for detecting a change in the plasma from ~~a~~ the normal plasma to ~~a~~ the toroidal ~~or faulty~~ plasma;

a control section for receiving a signal from the detector for determining a change of the plasma from the normal plasma ~~shape~~ to the toroidal ~~or faulty~~ plasma ~~shape~~; and

the control section being ~~for shutting~~configured to shut down the torch when the control section determines that the plasma changes from the normal plasma ~~shape~~ to the toroidal ~~or faulty~~ plasma ~~shape~~.

2. (Currently Amended) The spectrometer of claim 1 wherein the detector comprises an optical detector which is directed at a position at which the top region of the normal plasma will exist, so that if the normal plasma collapses into a toroidal ~~or faulty~~ plasma, the position of the plasma changes rapidly and the light intensity falling on the optical detector falls, thereby changing the signal produced by the optical detector so that the control section can recognise that the change in plasma shape has occurred.

3. (Currently Amended) The spectrometer of claim 1 wherein the ~~optical~~ detector is provided with a collimator and/or a lens for increasing the ratio of light received by

the ~~optical~~ detector when the normal plasma is in existence, compared to the light ~~intensity~~ received by the detector when the toroidal ~~or faulty~~ plasma is in existence.

4. (Currently Amended) The spectrometer of claim 1 ~~wherein~~ comprising an optical fibre or fibres or solid waveguide ~~may be used for conducting~~ arranged to conduct light to the ~~optical~~ detector.

5. (Currently Amended) The spectrometer of claim 3 wherein the ~~optical~~ detector is a photodiode.

6. (Currently Amended) The spectrometer of claim 1 wherein the detector is an electronic camera with suitable software to analyse the image of the plasma and determine its shape and position to thereby determine if the plasma has collapsed to the toroidal ~~or faulty~~ plasma ~~shape~~.

7. (Original) The spectrometer of claim 1 wherein the detector is a pixel array.

8. (Original) The spectrometer of claim 7 wherein the array is a linear photodiode array and the linear photodiode array is provided with a lens.

9. (Currently Amended) The spectrometer of claim 1 wherein the induction coil includes a generator for generating power to be supplied to the coil to activate the coil, and ~~preferably~~ the control section ~~switches~~ is adapted to shut down the torch by switching off the generator when the control section determines the change of shape from the normal plasma to the toroidal ~~or faulty~~ plasma ~~shape to shut down the torch~~.

10. (Original) The spectrometer of claim 1 wherein the detector is for determining the impedance value of the plasma in order to determine the change from the normal plasma to the toroidal plasma.

11. (Currently Amended) The spectrometer of claim 10 wherein the induction coil includes a generator for generating power to be supplied to the coil to activate the coil, and the impedance value is provided by measuring the voltage and current of a high voltage DC supply which feeds the generator.

12. (New) The spectrometer of claim 1 wherein the detector is a photodiode.

13. (New) The spectrometer of claim 2 wherein the detector is a photodiode.

14. (New) A method of controlling a plasma torch spectrometer, comprising:

producing a normal plasma in a tube of the spectrometer by application of gas to an inductively coupled plasma torch and activation of an induction coil to heat the gas, wherein the normal plasma is constrained within the tube, is separated from the tube and is capable of collapsing into a toroidal plasma;

a detector detecting a change in the plasma from the normal plasma to the toroidal plasma;

receiving a signal from the detector at a control section;

determining with the control section the change in the plasma from the normal plasma to the toroidal plasma; and

shutting down said torch with said control section when said control section determines that the plasma changes from the normal plasma to the toroidal plasma.